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Brinkmann

Brinkmann
Micro Manipulators
Precision-Made
Mechanical Positioners
for Science and Industry

BULLETIN BR-178
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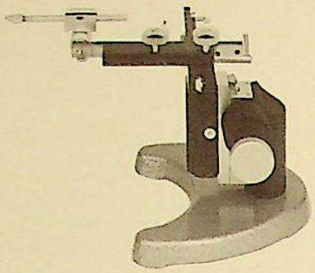
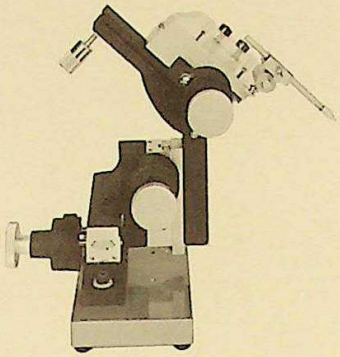
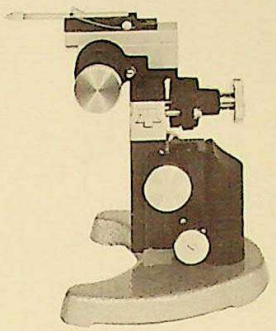


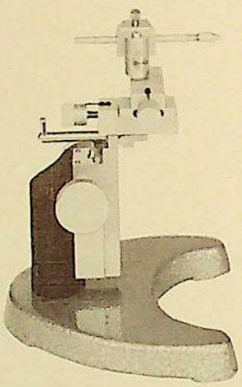
RP SERIES



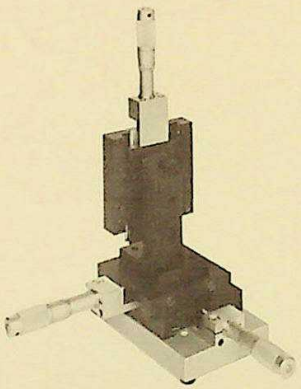
MP SERIES



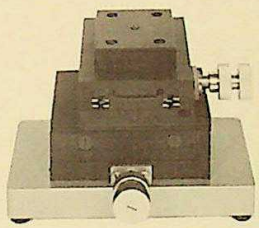
CP SERIES



HS SERIES

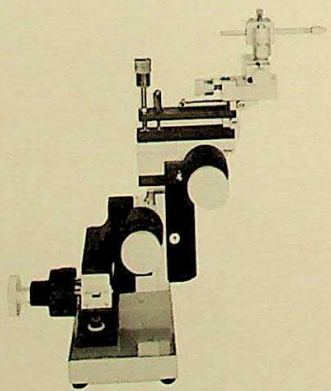


MS SERIES

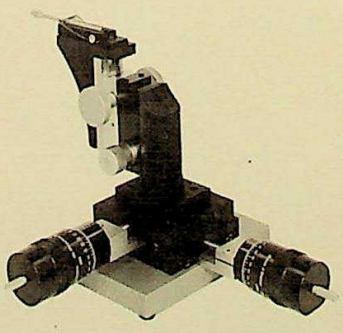


MR SERIES

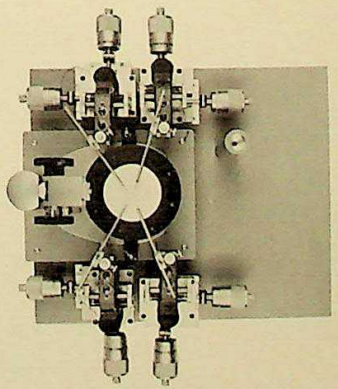
Optional supplementary movements—in addition to the three basic axes



High-sensitivity models with special micrometers



Multiple assemblies for unique requirements



The most comprehensive program of low-power mechanical micro positioners for use at magnifications up to 750 x

FEATURING:

- High-precision mechanical drives in various sensitivities for both macro and micro applications.
- A wide choice of different mounting assemblies suitable for a great variety of specific requirements.
- A comprehensive selection of clamps and instrument holders.
- Rotating devices for turning assemblies through 360°.
- Tilting devices with coarse and fine adjustments.
- Calibrated measuring facilities.
- Magnetic chucks for maximum positioning versatility.
- Single- or multiple-mounting on individual base plates, on vertical column stands, or on common baseplates with microscopes and other auxiliary equipment.

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This catalog presents the complete line of Brinkmann Low-Power Micro Manipulators, the largest and most versatile assortment currently available from any source.

Every Brinkmann Manipulator is individually assembled from carefully selected and extensively tested parts. Our experience, as developed during more than 25-years of manufacturing manipulators, is your guarantee of superior performance, minimum service, and long-life expectancy.

The various models offered differ primarily in regard to the types of movements used, the combination of different movements, and the layout (assembly) of these movements. Most of the regular accessories and special (optional) facilities, e.g., rotating and tilting devices, are available for all models.

In selecting a micro manipulator, all operating requirements should be considered by the user, especially the required excursion and sensitivity — the latter depends primarily on the magnification when a microscope is used—but also requirements in regard to the mounting arrangement, location of controls, etc. A variety of clamps are available for attaching instrument holders, tools, probes, or other accessories. Unless specified differently, Clamp A is furnished as standard equipment, while other clamps may be substituted at additional cost (exceptions include the RP and HS Series which are delivered with Clamp E and the MR and MS-I/II models which do not come with any clamp).

DESIGN

The manipulators in this catalog are commonly identified as "low-power" versions because they are *not* intended for classical applications in bacteriology or microbiology, which fields usually require only minute excursion ranges but maximum sensitivity for operations at high magnifications. Manipulators suitable for these fields are also offered by us, and descriptive literature will be sent upon request.

Low-power manipulators are designed for dissection and other operations in biology and physiology and for development applications in industry, especially when working with minature electronic components, bench-type optical systems (e.g., lasers), or for other similar tasks requiring high-precision and stability in the movement, transfer, alignment or assembly of small components.

In general, our manipulators are extremely versatile. They are designed to operate over extended ranges at different sensitivities; to carry relatively heavy loads; and to provide maximum flexibility in positioning the supporting clamp.

All models feature two- or three-dimensional movements, which may be identical, but, depending on requirements, may also be different. In other words, different drives may be combined on one manipulator. When the particular design involves 3-axes, these can be identified by the letters X, Y and Z, whereby X always refers to the horizontal movement which is parallel to the body of an operator sitting behind the unit and Y refers to the horizontal movement which is at right-angles to his body. Z is the vertical (up and down) axis.

Left- and right-hand designations also refer to a position which assumes that the operator is behind the manipulator, i.e. with the tool holder pointing away from him. This identification system must always be taken into account when considering any assembly of one or more instruments which will require operation of the manipulator from the side, rather than from the rear. Thus, a unit classified as left-hand is actually manipulated by the "right" hand when mounted sideways (see Figure 2, where the unit on the right side of the picture is a left-hand model).

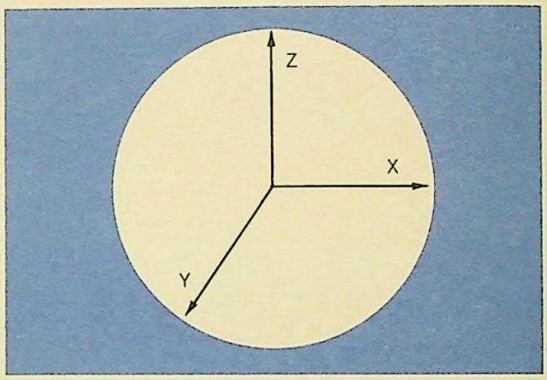
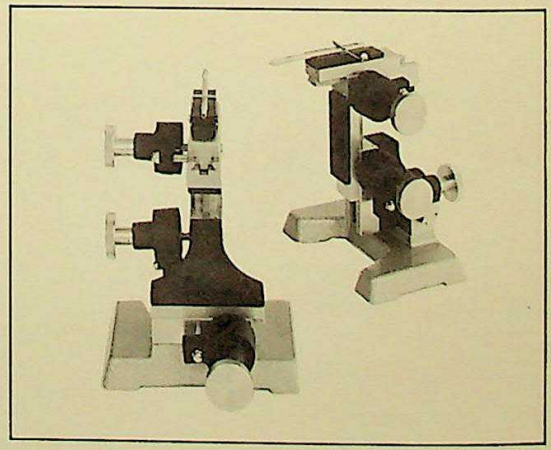


Figure 1

MODIFICATIONS

Because most of the components used in our designs are standardized parts which repeat themselves in different models, certain modifications are possible. Any desired modification which is practical will be quoted upon request, but such prices include a handling and design charge in addition to the cost of needed parts.

Figure 2 Designation of movements. Two MP-II/L (left-hand) Manipulators, Cat. No. 06 10 02, with standard Clamp A and optional Micro Vise VP (Cat. No. 06 90 20). This illustration shows how one and the same instrument can be used for left-hand operation when the user sits behind the manipulator and for right-hand operation when the manipulator is turned sideways.



Maximum flexibility for different requirements through optional features, such as...

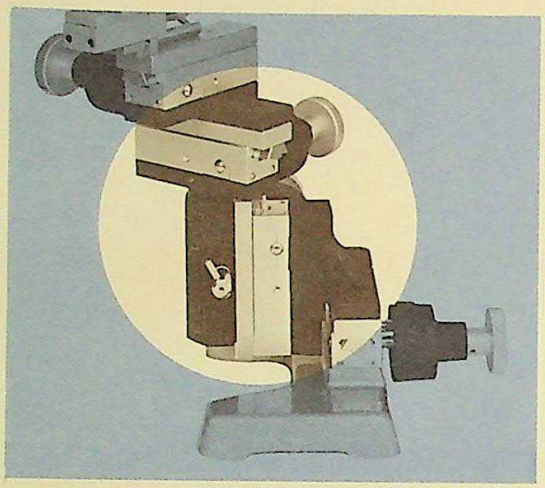


Figure 3

Rotating devices

Illustrated on a MP Manipulator.
See page 9.

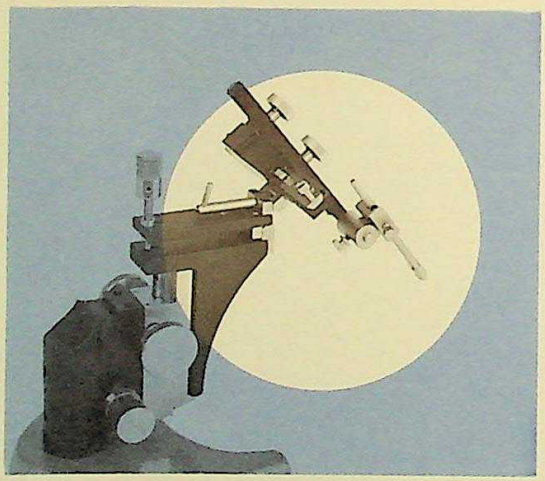


Figure 4

Tilting devices

An optional fine-tilting device is illustrated on a RP Manipulator.
See page 8.

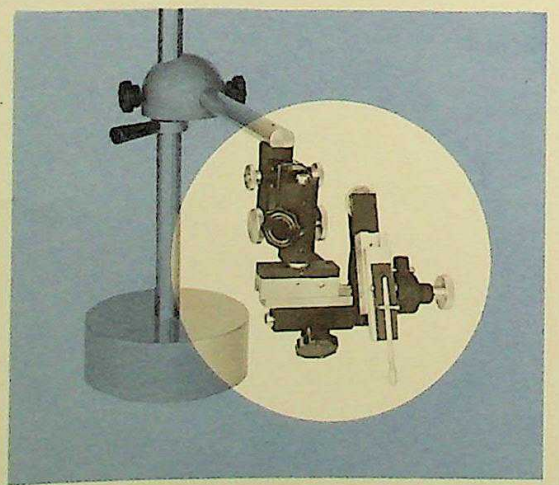


Figure 5

Special mounting systems

Most manipulators are delivered mounted on a small base with optional facilities for mounting on other supports. Some may also be suspended from a column stand. The model illustrated is a CP-V-CS on Column Stand C. This version includes both rotating and tilting devices as standard equipment.

Mechanical movements

DIMENSIONS*: MECHANICAL MOVEMENTS	WIDTH**	LENGTH	HEIGHT
S	25 mm (1 in.)	75 mm (3 in.)	30 mm (1-3/16 in.)
SL	25 mm (1 in.)	110 mm (4-5/16 in.)	30 mm (1-3/16 in.)
P	25 mm (1 in.)	75 mm (3 in.)	30 mm (1-3/16 in.)
PL	25 mm (1 in.)	110 mm (4-5/16 in.)	30 mm (1-3/16 in.)
BL	80 mm (3-1/8 in.)	50 mm (2 in.)	30 mm (1-3/16 in.)
RP	110 mm (4-5/16 in.)	130 mm (5-1/8 in.)	25 mm (1 in.)
HS	75 mm (3 in.)	75 mm (3 in.)	38 mm (1-1/2 in.)
MS	85 mm (3-1/4 in.)	85 mm (3-1/4 in.)	20 mm (3/4 in.)
MR	70 mm (2-3/4 in.)	100 mm (4 in.)	30 mm (1-3/16 in.)
MH	25 mm (1 in.)	170 mm*** (6-3/4 in.)	30 mm (1-3/16 in.)

*) Dimensions given are for single units, except for RP and HS types.

**) Without knobs or micrometer heads.

***) Includes micrometer head.

The various drives used on Brinkmann Micro Manipulators are illustrated. For technical details consult Table-I.

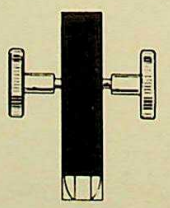
1. S AND SL DRIVES—consist of sturdy light-metal dovetail sliders with rack-and-pinion; usually furnished with drive knobs on both sides. The excursion range of the SL drive is approximately 35mm longer than that of the standard S unit.

2. P AND PL DRIVES—an exclusive Brinkmann modification of the S or SL movement; equipped with a 5:1 planetary reduction drive which covers the full excursion range, but offers greater sensitivity throughout this range. Drive knobs are provided on one side only. Specify left- or right-hand operation when ordering.

3. BL DRIVE—a combination rack-and-pinion "coarse" and microscope-type "fine" adjustment. Recommended for operations requiring a fast approach over a 50mm range and a limited, highly-sensitive fine motion. Drive knobs are provided on both sides, and the fine adjustment is calibrated.

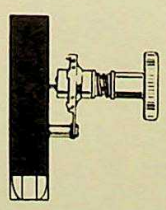
4. RP DRIVES—two rack-and-pinion movements of relatively light construction. Not recommended for mov-

Figure 6



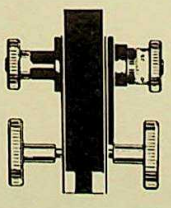
S and SL

Figure 7



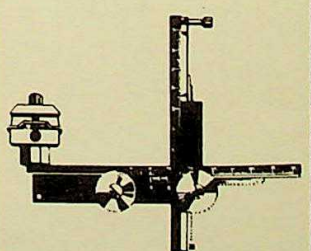
P and PL

Figure 8



BL

Figure 9



RP (X and Y)

TABLE I

SPECIFICATIONS: MECHANICAL MOVEMENTS

DRIVE DESIGNATION	MAXIMUM EXCURSION COARSE in.	COARSE mm	FINE in.	FINE mm	MAGNIFICATION LIMIT	TYPE	SCALES AND VERNIERS STANDARD	SCALES AND VERNIERS OPTIONAL	CATALOG NO. (WITHOUT INSTRUMENT CLAMP)
S	2-3/8	60	—	—	100 X	Single	—	0.1 mm	06 90 52
SL	3-3/4	95	—	—	100 X	Single	—	0.1 mm	06 90 61
P, left	2-3/8	60	—	—	250 X	Single	—	0.1 mm	06 90 53
P, right	2-3/8	60	—	—	250 X	Single	—	0.1 mm	06 90 54
PL, left	3-3/4	95	—	—	250 X	Single	—	0.1 mm	06 90 63
PL, right	3-3/4	95	—	—	250 X	Single	—	0.1 mm	06 90 65
BL	2-1/2	65	1/8	3	750 X	Single	0.004 mm*	0.1 mm	06 90 56
RP (X)	2-1/8	55	—	—	250 X	Cross Slide	0.1 mm	—	06 90 68
RP (Y)	3	75	—	—	250 X	Cross Slide	0.1 mm	—	
HS, left	—	—	1/4	6	500 X	Cross Slide	0.025 mm	—	06 90 60
HS, right	—	—	1/4	6	500 X	Cross Slide	0.025 mm	—	
MS	—	—	1-3/8	35	up to 750 X	Single	**	—	06 90 66**
MR	2-1/8	55	—	—	100 X	Single	—	—	06 90 67
MH	—	—	—	25	250 X	Single	0.01 mm	—	06 90 72
MH	—	—	1	—	250 X	Single	0.001 in.	—	06 90 74
									06 90 00
SCALES AND VERNIERS (0.1 mm) FOR ANY S OR D DRIVE									

*) Micrometer screw, fine adjustment drum.
**) Depending on micrometer heads, which are not included under this catalog number (see page 12).

ing heavier loads, but ideal for operating in limited space.

Scales and verniers are standard on this arrangement, as is a 90° tilting bracket with clamp. Suitable for either right- or left-hand use because drive knobs are located on top of the assembly. Accept type-E instrument clamp only.

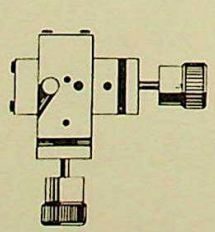
5. HS DRIVES—two short precision dovetails mounted at right angles on a 90° tilting bracket. Calibrated micrometer drive screws, acting against spring-pressure, provide the motion. Accept type-E instrument clamp only.

6. MS SLIDES—low-friction ball-bearing slides mounted in precision tracks of hardened steel set in aluminum bodies. Recommended for carrying heavier loads (1 lb. plus) and for applications requiring up to 35mm (1⅜") excursion at high senstitivity. The drive is operated by a micrometer head.

7. MR BALL-BEARING SLIDES—similar to MS, but with rack-and-pinion drive.

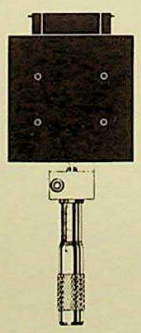
8. MH DRIVE—a sturdy dovetail slider with micrometer screw.

Figure 10



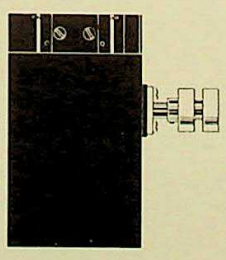
HS (X and Y)

Figure 11



MS

Figure 12



MR

Figure 13

MH

RP Series

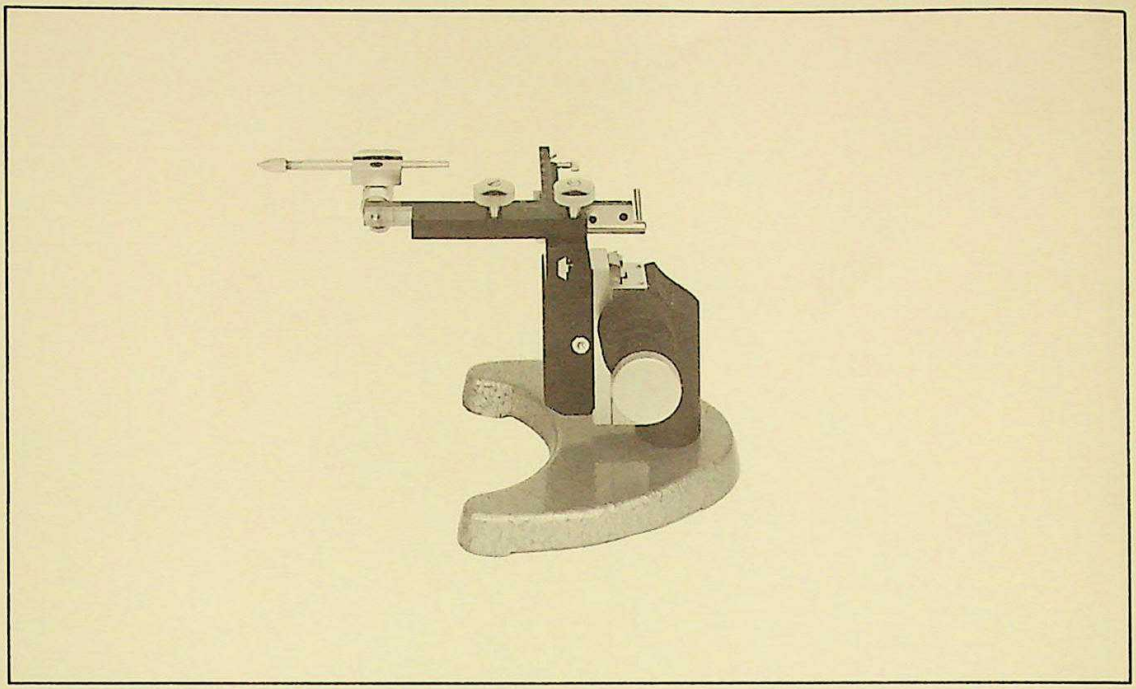


Figure 14 RP-IV/L Manipulator (Cat. No. 06 00 05) with optional Rotating Device (Cat. No. 06 00 20).

This is an X-Y assembly of two drives, similar to a microscope stage. It is mounted on a 90° tilting bracket which, in turn, is attached to a vertical drive mounted on a short pillar. Usually furnished with a horseshoe base, RP-manipulators can easily be mounted on other appliances, on a large column stand, or on one of the large Brinkmann platforms (singly or paired).

Additional, accurately-controlled fine-tilting and rotating devices are available (see "Auxiliary Movements", page 14).

A choice of three drives is offered for the vertical adjustment (Z-axis). A magnetic chuck for mounting the manipulator on any magnetically susceptible surface can be substituted for the standard pillar (see Figure 25).

The only instrument clamp offered for RP-manipulators is type-E, which can be rotated and tilted through 360°. Manipulators ordered with a P-drive in the Z-axis must be specified for left- or right-hand operation.

TECHNICAL DATA

	DIMENSIONS: LENGTH	WIDTH	HEIGHT
Overall minimum	6" (155 mm)	5½" (140 mm)	6¼" (160 mm)
Horseshoe Base	6" (155 mm)	5½" (140 mm)	¾" (20 mm)

NET WEIGHT:

RP-manipulators complete with base; approx.	7 lbs.
without base; approx.	3 lbs.
with Column Stand C; approx.	50 lbs.

RP SERIES: SPECIFICATIONS AND CATALOG NUMBERS

MODEL*	MOVEMENTS X-Y	MOVEMENTS Z	MAXIMUM MAGNIFICATION	WITH HORSESHOE BASE	WITH COLUMN STAND C	WITH MAGNETIC CHUCK
RP-III	RP	S	250 X	06 00 00	06 00 01	06 00 16
RP-IV/R	RP	P	250 X	06 00 04	06 00 06	06 00 17
RP-IV/L	RP	P	250 X	06 00 05	06 00 07	06 00 18
RP-V	RP	BL	250 X	06 00 14	06 00 15	06 00 19

*Suffix "R" or "L" refers to right-hand or left-hand model.

MP Series

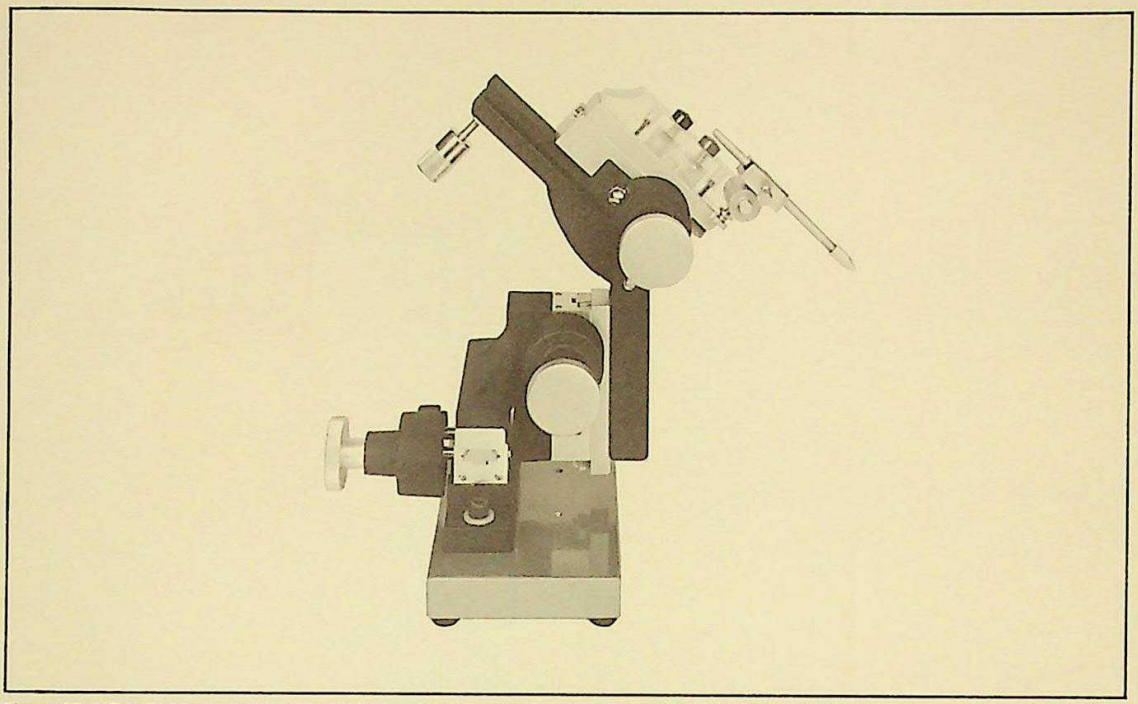


Figure 15 MP-II/R Manipulator with optional Base Bracket (Cat. No. 06 10 11), optional Rectangular Steel Base (Cat. No. 06 90 78), optional Clamp B (Cat. No. 06 90 12), and optional Tilting Device (Cat. No. 06 01 22) with coarse and fine adjustment for Y-axis.

This is a compact design for operations requiring either exceptional stability or the application of greater force. MP models are most popular with industrial users, e.g. development of electronic components. The drives are connected by sturdy cast aluminum brackets and the arrangement of the vertical (Z) drive between the X and Y movements produces an instrument of limited height, which is easy to manipulate. Users can choose from a wide selection of basic movements and auxiliary devices.
To mount MP-manipulators on larger platforms or on other appliances, a special model with a base bracket having two mounting holes should be chosen, instead of the small horseshoe foot normally supplied. MP-manipulators equipped with P-drives must be specified for left- or right-hand operation.

TECHNICAL DATA

	DIMENSIONS: LENGTH	WIDTH	HEIGHT
Overall minimum;	7″ (180 mm)	6″ (150 mm)	6½″ (170 mm)
Base only;	4″ (100 mm)	6″ (155 mm)	¾″ (20 mm)
Base-Bracket only;	4½″	1¼″	1″

MOUNTING HOLES (IN BASE-BRACKET):
Center Distance; 3¾″ (95 mm)
Diameter; ¼″ (5 mm)

NET WEIGHT:
MP-manipulators with horseshoe base; approx. 7 lbs.
Horseshoe Base alone; 3 lbs. 3 oz.

MP SERIES: SPECIFICATIONS AND CATALOG NUMBERS

MODEL*	MOVEMENTS X	Y	Z	MAGNIFICATION MAXIMUM	WITH HORSESHOE BASE	WITH BASE BRACKET**
MP-I	S	S	S	100X	06 10 00	06 10 10
MP-II/R	P	P	P	250X	06 10 01	06 10 11
MP-II/L	P	P	P	250X	06 10 02	06 10 12
MP-IV/R	P	BL	P	250X	06 10 06	06 10 13
MP-IV/L	P	BL	P	250X	06 10 07	06 10 14
MP-V/R	P	P	BL	250X	06 10 08	06 10 15
MP-V/L	P	P	BL	250X	06 10 09	06 10 16

*Suffix "R" or "L" refers to right-hand or left-hand model.
**Needed to attach MP-manipulators to other bases or to other appliances.

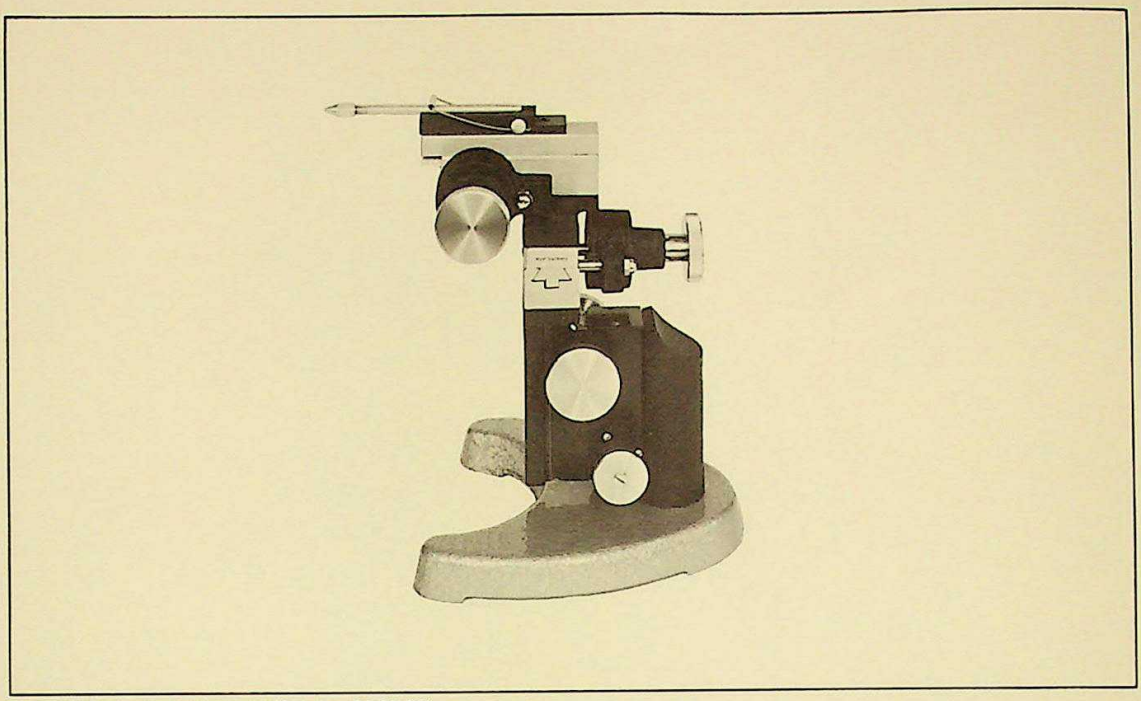


Figure 16 CP-V/L Manipulator (Cat. No. 06 20 12).

These manipulators differ from the MP Series in respect to the arrangement of the X and Y movements, which, in this case, are adjacent to each other; also the basic mounting on a short pillar, which permits attachment to any surface of 1¼" (approximately 30mm) diameter or to the large Column Stand C is different.

The CP design results in a slight increase in overall height but permits simultaneous rotation of the X and Y movements (with the optional rotating device), which is sometimes desirable. Otherwise, the same variations of basic and auxiliary movements are offered, plus a special version (CP-VI which features a combination of three BL-drives not available on any other model.

Normally, CP-manipulators are furnished with a horseshoe base from which they can be removed for mounting on other supports. Models equipped with P-drives must be specified for left- or right-hand operation (Figure 16).

The CP-V-CS for use with the large Column Stand C is a modification suitable for both left- and right-hand operation. It can be taken off the stand and may then be attached to the regular horseshoe base or to any other suitable base. Both the X and the Y movement can be rotated through a full 360° circle (optional on other models), and a tilting device with fine adjustment is also part of the standard equipment.

TECHNICAL DATA

	DIMENSIONS: LENGTH	WIDTH	HEIGHT
Overall minimum;	6" (150 mm)	6" (150 mm)	8" (205 mm)
Base only;	6" (150 mm)	5½" (140 mm)	¾" (20 mm)

NET WEIGHT:
CP-manipulators with horseshoe base; approx. 9 lbs.
Hoseshoe base alone; 3½ lbs.
CP-V-CS Manipulator with Column Stand C; approx. 65 lbs.

Maximum distance between front of Clamp A and rear of base: 8" (200 mm)

CP SERIES: SPECIFICATIONS AND CATALOG NUMBERS

MODEL*	MOVEMENTS X	Y	Z	MAXIMUM MAGNIFICATION	WITH HORSESHOE BASE	WITH COLUMN STAND "C"
CP-I	S	S	S	100X	06 20 00	—
CP-II/R	P	P	P	250X	06 20 02	—
CP-II/L	P	P	P	250X	06 20 04	—
CP-V/R	P	P	BL	250X	06 20 10	—
CP-V/L	P	P	BL	250X	06 20 12	—
CP-VI	BL	BL	BL	500X	06 20 14	—
CP-V-CS	P	P	BL	250X	—	06 20 16

*Suffix "R" or "L" refers to right-hand or left-hand models.

HS Series

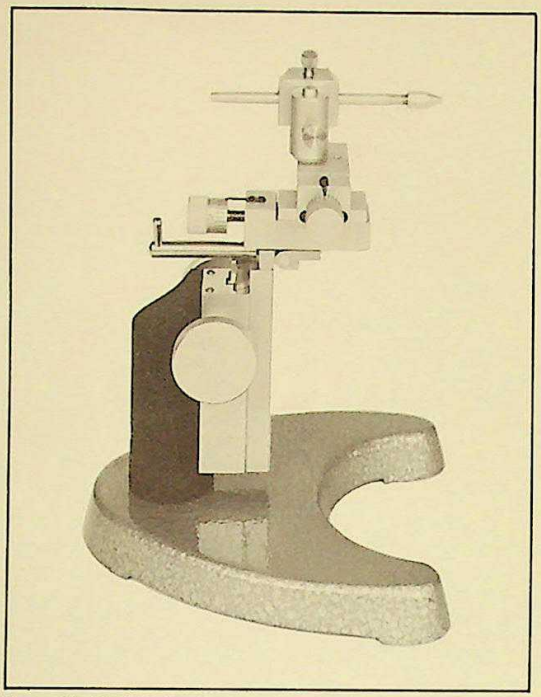


Figure 17 HS-II/R Manipulator (Cat. No. 06 40 04).

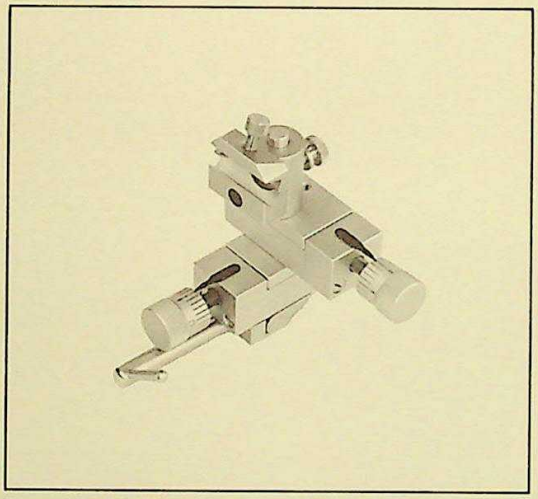


Figure 18 HS-O/L Manipulator (Cat. No. 06 40 14).

These manipulators are small, reasonably-priced units which provide high-sensitivity adjustment over a 6 mm (¼") range. They are ideal as supplementary movements and are popular for incorporation into other types of instruments or apparatus assemblies, especially when mounting space is limited.

A basic HS-assembly consists of two dovetail movements. These are mounted at right angles to each other and are attached to a 90° tilting bracket with clamp. Graduated micrometer screws (0.025 mm) push the sliders against pressure strings. HS units can be mounted on other manipulators, either for the purpose of increasing sensitivity or to make them more versatile by increasing directional flexibility beyond the basic three-axes movements. Figure 3 shows such an arrangement of an HS unit mounted on top of a MP model.

For independent operation, HS-drives can be ordered with a horseshoe base and pillar (Figure 17), with a magnetic chuck and vertical adjustment (Figure 26), or mounted on a bracket which slides along on 11 x ¾" column (Figure 29).

Individual HS drives without instrument clamps can be ordered from Table-I.

TECHNICAL DATA

	DIMENSIONS: LENGTH	WIDTH	HEIGHT
Two drives only;	3" (75 mm)	3" (75 mm)	1½" (38 mm)
HS-II with base;	5½" (140 mm)	6" (155 mm)	6" (190 mm)

Maximum distance of Instrument Clamp E from rear of base- HS-II; 3½", (88 mm)
Maximum distance of Instrument Clamp E from center upright- HS-I; 4½", (113 mm)

NET WEIGHT:
HS-I, complete; 5½ lbs.
HS-II, complete; 4½ lbs.
Set of HS drives only; 7 oz.

HS SERIES: SPECIFICATIONS AND CATALOG NUMBERS
Models listed here are equipped with the type-E instrument clamp and can be used at magnifications up to 500X.

MODEL*	BASE	MOVEMENTS X	MOVEMENTS Y	MOVEMENTS Z	CATALOG NO.	
HS-O/R	Unattached	HS/R	HS/R	—	06 40 12	
HS-O/L	Unattached	HS/L	HS/L	—	06 40 14	
HS-I/R	Column stand	HS/R	HS/R	**	06 40 00	
HS-I/L	Column stand	HS/L	HS/L	**	06 40 02	
					WITH PILLAR	WITH MAGNETIC CHUCK
HS-II/R	Horseshoe	HS/R	HS/R	S	06 40 04	06 40 15
HS-II/L	Horseshoe	HS/L	HS/L	S	06 40 06	06 40 16
HS-III/R	Horseshoe	HS/R	HS/R	P	06 40 08	06 40 17
HS-III/L	Horseshoe	HS/L	HS/L	P	06 40 10	06 40 18

*Suffix "R" or "L" refers to right-hand or left-hand model.

**Vertical adjustment by hand along 11" upright.

MS Series

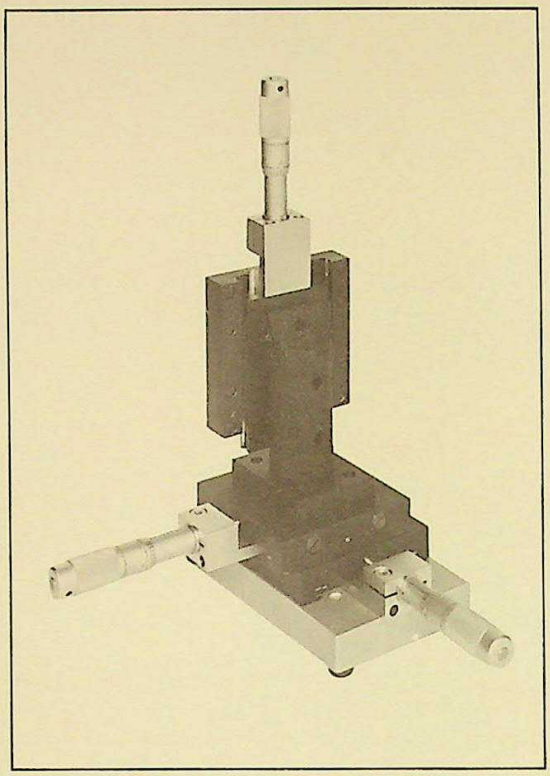


Figure 19 MS-II-A Manipulator (Cat. No. 06 30 04).

These manipulators offer features not available in any of the other models, including greater load capacity (1 lb. plus), extended ranges (which can be traversed at high sensitivities), and measuring facilities for determining excursion lengths.

Improved stability results from the low center of gravity, because the X and Y movements and control knobs are at table-level.

These characteristics are possible because of a substantial reduction in friction resulting from the use of precision ball-bearing slides, instead of the conventional dovetails. Overall weight has been kept low by setting the hardened ball-bearing steel tracks in lightweight aluminum bodies. Identical cross-slides are used on all MS models. Slotted mounting plates can be provided for attaching the slides either to one of the Brinkmann bases or to other appliances. Provisions are made for easily mounting auxiliary devices to the top of the MS by means of a small plate and upright ¼-20 screw.

The movement is imparted to the slides by micrometer heads which are available with different sensitivities, calibrated in inches or millimeters.

Three versions of MS-manipulators are offered:

MS-I SERIES, consisting of 1 set of cross slides for X and Y movement.

MS-II SERIES, consisting of 1 set of cross slides for X and Y movements and an identical slide for the Z-axis.

MS-V SERIES, consisting of 1 set of cross slides for X and Y movements and a BL-drive for the Z-axis. MS-V units are fitted with a type-A instrument clamp and will accept standard rotating or tilting devices for the bracket which carries the clamp. The bracket may be equipped with an additional S, P or MH drive for providing thrust along the axis of a tool.

MS MANIPULATOR MODELS

TYPE	NO. OF AXES	CATALOG NO
MS-I-A	2	06 30 00
MS-I-B	2	06 30 24
MS-I-C	2	06 30 25
MS-I-D	2	06 30 26
MS-I-E	2	06 30 02
MS-I-F	2	06 30 03
MS-I-G	2	06 30 09
MS-I-H	2	06 30 11
MS-II-A	3	06 30 04
MS-II-B	3	06 30 12
MS-II-C	3	06 30 05
MS-II-D	3	06 30 07
MS-II-E	3	06 30 10
MS-II-F	3	06 30 16
MS-II-G	3	06 30 17
MS-II-H	3	06 30 19
MS-V-A	3	06 30 44
MS-V-B	3	06 30 45
MS-V-C	3	06 30 46
MS-V-D	3	06 30 47
MS-V-E	3	06 30 20
MS-V-F	3	06 30 21
MS-V-G	3	06 30 23
MS-V-H	3	06 30 27

MICROMETER HEADS

TYPE	RANGE in.	RANGE mm	ACCURACY
A	1	—	0.001"
B	1	—	0.0001"
C	1½	—	0.001"
D	1½	—	0.0001"
E	—	25	0.01mm
F	—	25	0.002mm
G	—	35	0.01mm
H	—	35	0.002mm

TECHNICAL DATA

	DIMENSIONS: LENGTH	WIDTH	HEIGHT
MS-I;	4¾" (120 mm)	4¾" (120 mm)	1½" (35 mm)
MS-II/III;	4¾" (120 mm)	4¾" (120 mm)	11" (185 mm)
MS-V;	4¾" (120 mm)	4¾" (120 mm)	6½" (140 mm)

MICROMETER HEADS:	MINIMUM LENGTH	DIAMETER
0.01 mm/0.001"	2¼"	⅝"
0.002 mm/0.0001"	3"	1½"

Bottom plate; 4½ x 4½" (115 x 115 mm)

Top plate; 3⅜ x 3⅜" (85 x 85 mm)

NET WEIGHT: MS-I; 8 lbs.
MS-II/III; 9½ lbs.
MS-V with small steel base; 10½ lbs.

MR Series

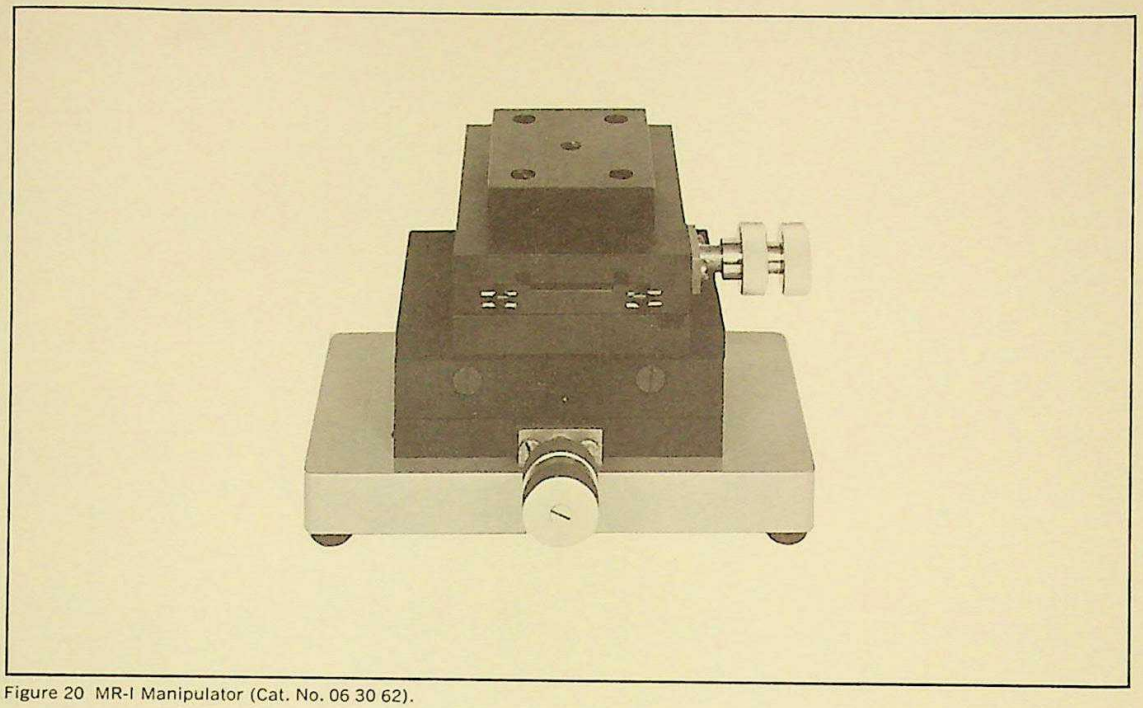


Figure 20 MR-I Manipulator (Cat. No. 06 30 62).

MR-manipulators are designed to provide maximum rigidity in two horizontal directions. They offer ball-bearing slides for both the X and Y movements but do not require micrometer head drives. The movements themselves are activated by precision rack-and-pinion drives, with a locking nut to arrest the motion at any point. Four threaded 6/40 holes are provided in the top plate for mounting auxiliary devices.
In addition to the individual drive listed in Table-I, the only model available is the MR-I, which is essentially an X-Y movement. Calibrated scales are not offered for this manipulator, and maximum recommended magnification is approximately 100 to 150 X. The manipulator is furnished with either a small rectangular steel base or a slotted mounting plate.

TECHNICAL DATA

	DIMENSIONS: LENGTH	WIDTH	HEIGHT
Top plate, MR-I;	4" (100 mm)	2¾" (70 mm)	— —
MR-I including base;	5" (125 mm)	6" (150 mm)	3½" (90 mm)
Steel base only;	6" (155 mm)	3½" (90 mm)	1" (25 mm)

NET WEIGHT:
MR-I; 3 lbs. (without base)

MODEL	MOVEMENTS X	Y	Z	CATALOG NO. WITH SMALL STEEL BASE	CATALOG NO. WITH SLOTTED MOUNTING PLATE
MR-I	MR	MR	—	06 30 62	06 30 59

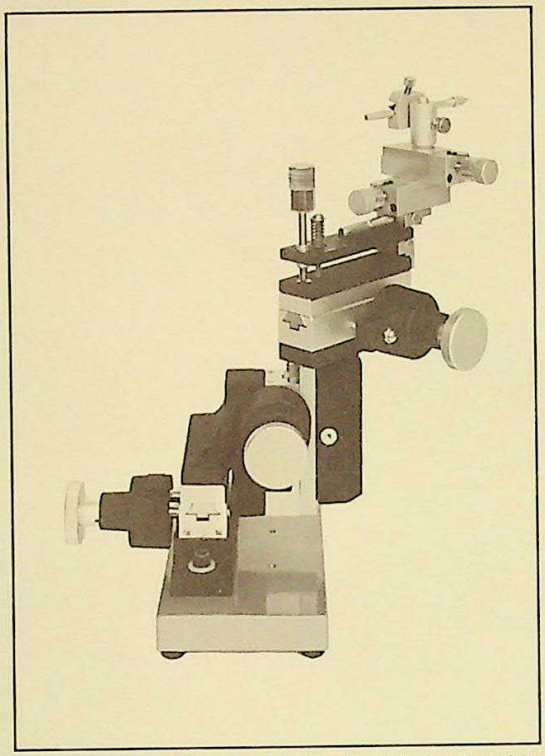


Figure 21 Optional Rotating Device for axis illustrated on MP-II Manipulator.

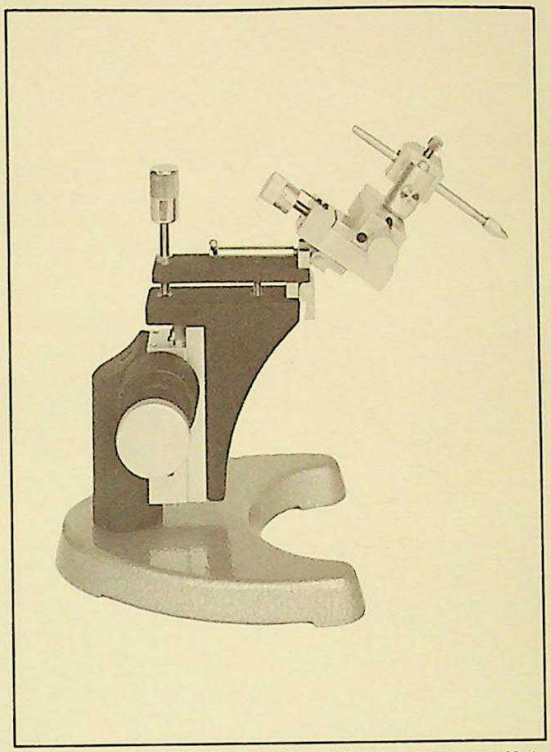


Figure 22 Optional Tilting Device with fine adjustment (Cat. No. 06 00 22) for all RP and HS-II/III models. Illustrated on HS-III/R Manipulator (Cat. No. 06 40 08).

The supplementary movements listed below can be provided for all models, except those in the MS-I, MS-II and MR Series.
To order, select the desired movement from the table and add the respective Catalog Number to that of the basic manipulator.

ROTATING DEVICES

The rotating device facilitates the removal of the instrument clamp or tool from an operating area or from a field of view in a microscope without moving the manipulator or changing the position of any drive. Since Clamp E can itself be rotated, it is sometimes superfluous to order a rotating device for models already equipped with such a clamp (RP and HS Series). This accessory is recommended for convenient access to the tools in the instrument holder without disturbing other parts of an experimental set-up for transferring objects from one area to another and for other similar purposes.
The 360° rotating device consists of a long shaft and a sturdy bearing with an arrestment clamp. A divided circle is provided for resetting (Figure 21).

TILTING DEVICES

A 90° coarse-tilting bracket is furnished routinely with all RP- and HS-drives. This bracket can be supplemented by an additional fine-tilting movement (Figure 22) which provides a micrometer adjustment covering an arc of approximately 15°.
For all other models, a combination coarse- and fine-tilting bracket is available. It consists of a 90° coarse movement with locking lever and the supplementary fine adjustment mentioned previously (Figure 23). In addition to its primary purpose, the execution of angled thrusts, the tilting-bracket also facilitates access to areas which could not be reached by other means (e.g., implantation of electrodes in experimental animals, etc.).

AUXILIARY DRIVE MH

A MH-drive can be substituted as shown for any S, SL, P, PL or BL-drive in the Y-axis only, if a controlled fine-advance over a range of 25mm (1") with measuring facilities is required. Select metric or inch drive from Table-I.

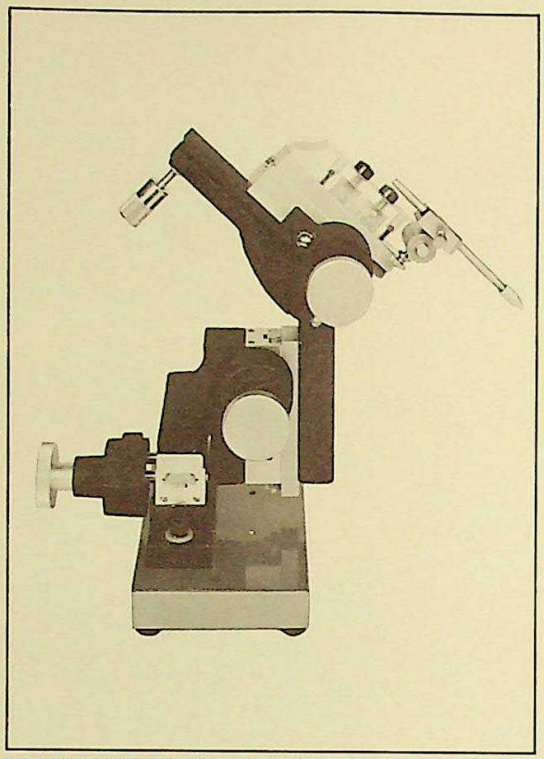


Figure 23 Optional Tilting Device with fine adjustment of the type used for MP, CP and MS-V Manipulators.

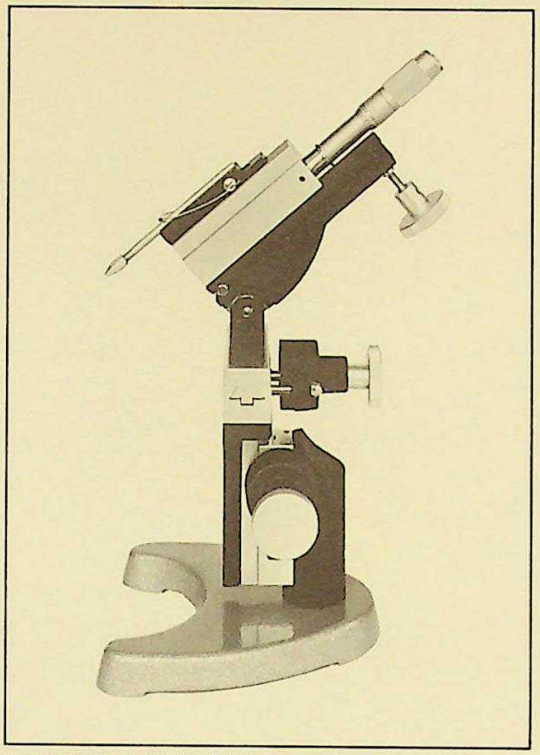


Figure 24 Optional MH-Drive mounted on a CP Manipulator instead of standard Y-drive, plus optional coarse and fine tilting device.

SUPPLEMENTARY AUXILIARY MOVEMENTS: SPECIFICATIONS

SERIES	TILTING DEVICES COARSE	FINE	CATALOG NO.*	ROTATING DEVICES Y-AXIS ONLY	X- AND Y-AXIS	CATALOG NO.*
RP	—	X	06 00 22	—	X	06 00 20
MP	X	X	06 01 22	X	—	06 01 20
CP**	X	X	06 02 22	—	X	06 01 20
HS-I	—	X	06 00 23	—	—	—
HS-II & III	—	X	06 00 22	—	X	06 01 20
MS-V	X	X	06 01 22	X	—	06 01 20

*To be added to Cat. No. of basic unit selected.
**Except Model CP-V-CS which includes these facilities as standard equipment.

Bases, platforms and stands

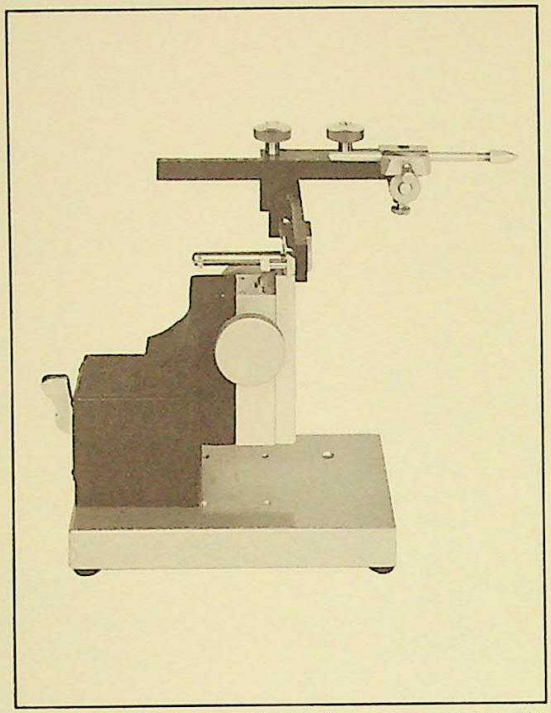


Figure 25 Optional Magnetic Chuck arrangement for RP-manipulators. Illustrated with small steel base, type-BM, on Model RP-III (Cat. No. 06 00 16, complete).

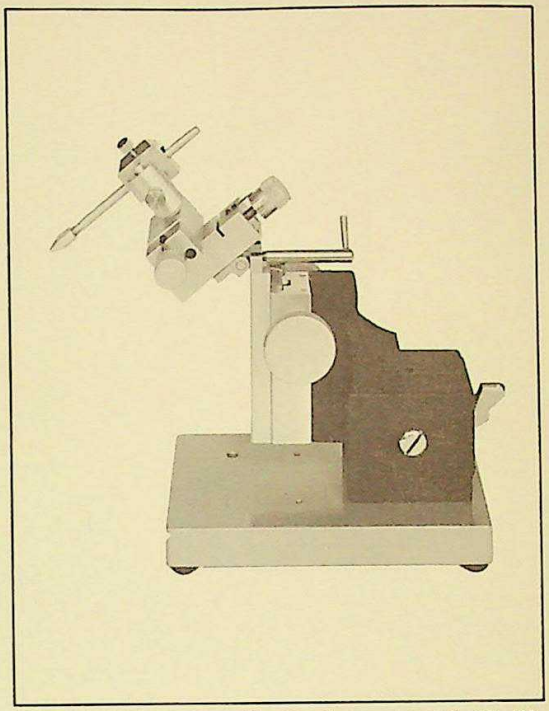


Figure 26 Optional Magnetic Chuck arrangement for HS-manipulators. Illustrated with small steel base, type-BM, on Model HS-II/L (Cat. No. 06 40 16, complete).

Various bases, platforms and stands for mounting Brinkmann Micro Manipulators singly or in combinations of up to four units on one common baseplate are available. Manipulators which can be equipped with a magnetic chuck are listed in the tables covering the different models.

CATALOG NO. SMALL BASES AND BRACKETS:

06 90 75 Small Horseshoe Base, Model BH, cast iron, curved-type as supplied with RP, CP and HS series, but without vertical pillar.

06 90 77 Small Horseshoe Base, Model BH, with pillar (see Figure 14).

06 90 76 Small Horseshoe Base, Model MP, cast iron, rectangular version, standard with MP models (see Figure 2).

06 90 78 Small Rectangular Base, Model BM, steel, for MP models equipped with a base bracket and for other manipulators equipped with a magnetic chuck (see Figures 15 and 25).

06 90 79 Base Bracket for MP models without standard MP base. Can be used to attach MP manipulators to Base BM or to larger bases (see Figure 15).

Some of the manipulators can now be mounted on an optional magnetic chuck which is then substituted for a standard base or column. The magnet has a push-button on/off control which instantly disconnects the manipulator from any steel surface, e.g., from one of our large steel platforms (Cat. No. 06 90 92 or 06 90 91) or our small steel base plate (Cat. No. 06 90 78), and still permits fixed positioning (as though the manipulator were bolted down). See Figures 25 and 26. The advantage of this system is that it allows the user a great deal of flexibility in arranging an assembly; it may be especially helpful if two or more manipulators are to be mounted around a special work area.

MAGNETIC CHUCK

06 90 80 Magnetic Chuck, alone, without base or manipulator.

SLOTTED MOUNTING PLATE

06 90 90 Slotted Mounting Plate, for attaching MS or MR manipulators to bases or platforms.

STEEL PLATFORMS

These are fabricated from ground and polished steel, are finished in grey enamel and are mounted on small rubber supports. If ordered with a Brinkmann Micro Manipulator, the necessary holes for attaching the instrument are provided.

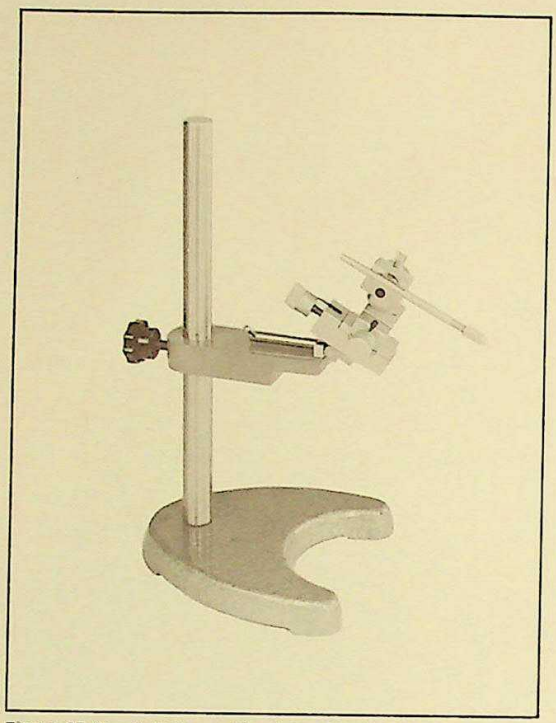


Figure 27 Small Column Stand H with HS-I/R Manipulator (Cat. No. 06 40 00).

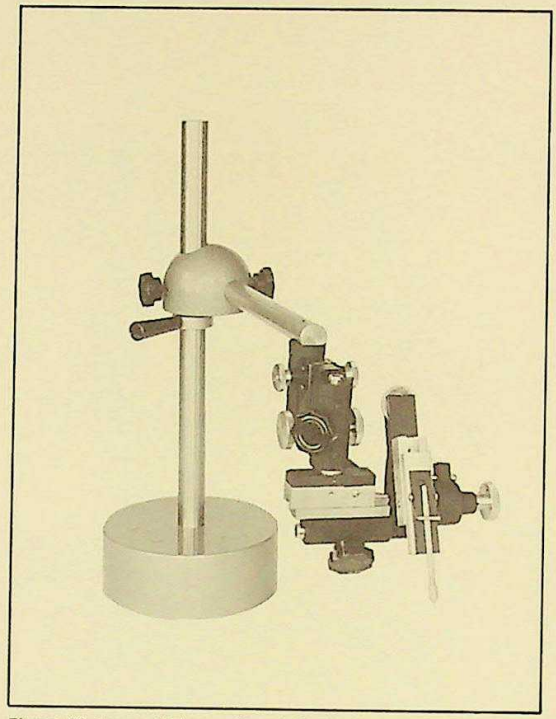


Figure 28 Large Column Stand C illustrated with CP-V-CS Manipulator (Cat. No. 06 20 16).

06 90 91 Steel Base, size I: 12 x 17 x ½"; net weight 14 lbs.

06 90 92 Steel Base, size II: 10 x 21 x ⅜"; net weight 22 lbs.

ALUMINUM PLATFORMS

Sturdy light-weight aluminum castings, furnished with the necessary holes when ordered with a manipulator. A modification with a raised center platform is listed.

06 90 93 Aluminum Base, size III: 12 x 21 x ¾"; net weight 7½ lbs.

06 90 95 Aluminum Base, size IV: 12 x 17 x ¾"; net weight 6½ lbs.

06 90 94 Aluminum Base, size V: 12 x 17 x ¾"; with raised center platform 9 x 11 x ½" (Specify desired height of center platform when ordering); net weight 11 lbs.

INSULATED CENTER POST

06 90 81 Insulated Center Post, for mounting on all large bases. The post is approximately 5" high and is fitted with a rotating, removable bakelite stage 40 x 40 mm (approximately 1½ x 1½")

COLUMN STANDS

06 90 70 Large Column Stand C, for suspending RP or CP manipulators over large objects.

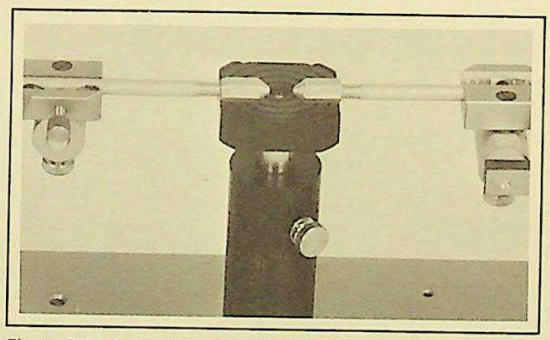


Figure 29 Insulated Center Post (Cat. No. 06 90 81) mounted on optional larger base platform.

06 90 01 Column Stand C with fittings for Zeiss Stereo Microscopes
Dimensions: Circular base: dia. 8", height 3" (250 x 75mm)
Upright; 1¼" dia. x 22" height (32 x 560mm)
Horizontal arm; length 16" (from center of upright)

06 90 73 Small Column Stand H, with bracket for attaching a set of HS Drives (see Figure 29)

Instrument clamps

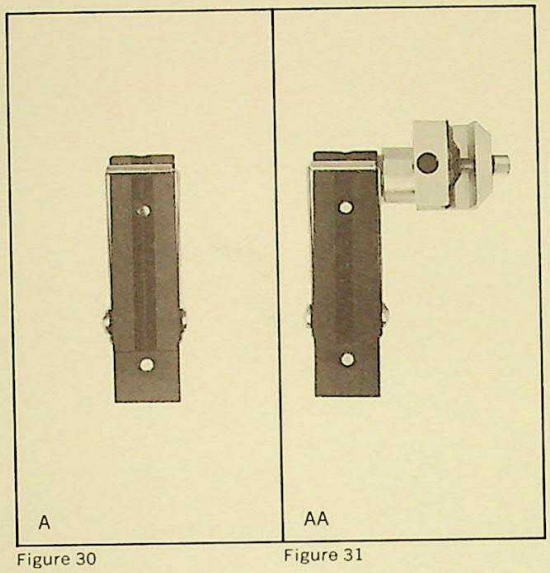


Figure 30

Figure 31

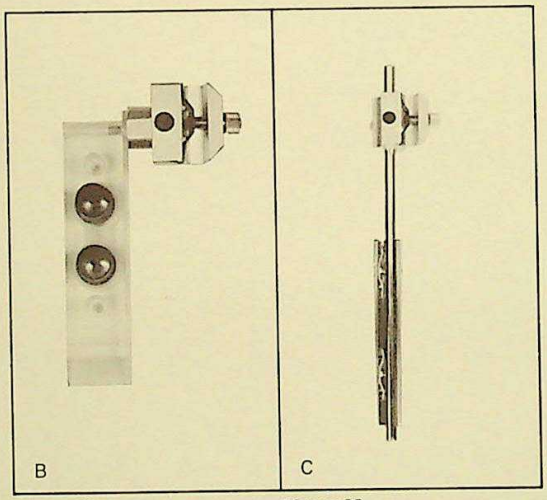


Figure 32

Figure 33

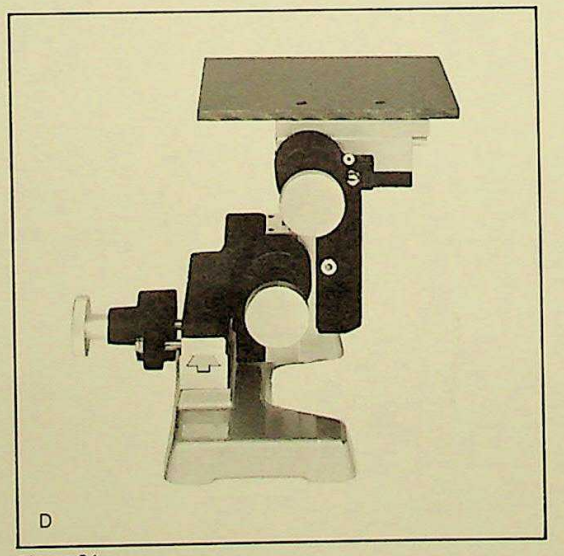


Figure 34

For mounting and adjusting the position of micro tools, electrodes, probes, etc., a number of different instrument clamps and a platform stage (table) are offered. All of these can be removed (by the user) to convert to another clamp, or to install special assemblies which are better suited to unique individual requirements.

CLAMP A—CATALOG NO. 06 90 10

This clamp is the standard instrument holder for MP, CP, MS-V Manipulators. It is a 2¾ x ¾" bakelite body which has a V-groove bed 2¼" (56 mm) long. A strong spring-clamp (mounted on top) will hold round, square, or hexagonal objects to a maximum diameter of ¼" (6 mm). Such objects (tools, needles, vises, wires, electrodes, etc.) can be rotated and advanced, or retracted, manually under the spring.

CLAMP AA—CATALOG NO. 06 90 11

This clamp is a modification of the above. An additional Clamp E is directly adjacent to Clamp A to provide dual mounting facilities.

CLAMP B—CATALOG NO. 06 90 12

This clamp is intended primarily for probes which are used to pick up electrical impulses for transmission to a monitoring or measuring instrument. The wire leading to the probe is plugged into the front insulated receptacle in the body of the clamp. Connection to a measuring instrument is made from a second terminal behind the first one. The two are internally connected, which prevents unnecessary strain on the lead wire during manipulation. Dimensions of the Lucite body are 3½" x ⅞" x ¾".

CLAMP C—CATALOG NO. 06 90 15

This clamp is intended only for operations which require a greater clearance between the work point and the manipulator itself. It consists of a metal body 3½" (86 mm) long with a rectangular bed and positioning springs to accommodate auxiliary objects, e.g., extension rods, up to ¼" (6 mm) wide. Two locking screws position the holding springs. It is delivered with one 8" extension rod and Clamp E.

PLATFORM D—CATALOG NO. 06 90 16

This is actually a flat (plastic) stage which can be mounted on top of any MP, CP or MS-V Manipulator after the standard clamp is removed (see Figure 34). If any of these manipulators are equipped with an additional HS-drive, this must be removed also. The dimensions of the stage are 4 x 6" (100 x 150 mm), and it can be used to support small animals, apparatus or other objects for careful, mechanical manipulation.

Information contained herein is not binding as to illustrations, specifications and/or prices, which are subject to change without notice.

CLAMP E—CATALOG NO. 06 90 17

This clamp is the standard clamp used on RP and HS Manipulators; it must also be ordered for HS drive modifications, e.g., MP-V with HS, CP-V with HS, etc.; otherwise these manipulators would not include any clamp at all.

Clamp E is universally adjustable in two planes (rotating and tilting); it has a bed ⅞" (22 mm) long which will accommodate objects up to 6 mm (¼") wide. The holding-spring is adjustable with a locking screw.

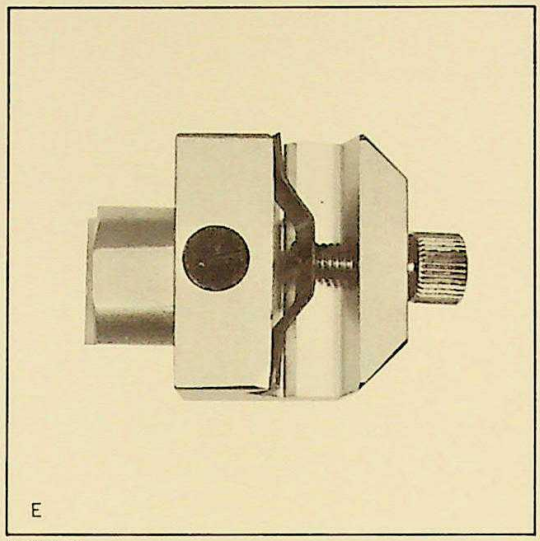


Figure 35

Tool holders

CATALOG NO. 06 90 20

Micro Vise "VP" is a holder for micro pipets. It is equipped with a 4" smooth shaft fitting the various clamps and has a tapered end to accept a male Luer connection. The pipet, which should not have a diameter greater than 0.8 mm, is secured in place by the removable head, pressure ring and gasket.

CATALOG NO. 06 90 21

Micro Vise "VC" is a miniature micro chuck with a smooth 3" shaft fitting the various clamps. It will accept needles, probes, etc. up to 1 mm diameter.

CATALOG NO. 06 90 24

The Micro Injection Apparatus is designed to facilitate the injection or aspiration of small amounts of liquid within the work area. It consists of a base bracket designed to be fastened to any larger baseplate, an adjustable clamp for a syringe, a 2 ml syringe, and a piece of capillary tubing with two Luer connections.

CATALOG NO. 06 90 26

A micrometer screw with holder which fits on the micro injection apparatus for accurate control of dosing.

NOTE: If the injection apparatus is to be used independent of a large baseplate, we recommend the purchase of a small steel base Cat. No. 06 90 78 for additional rigidity.

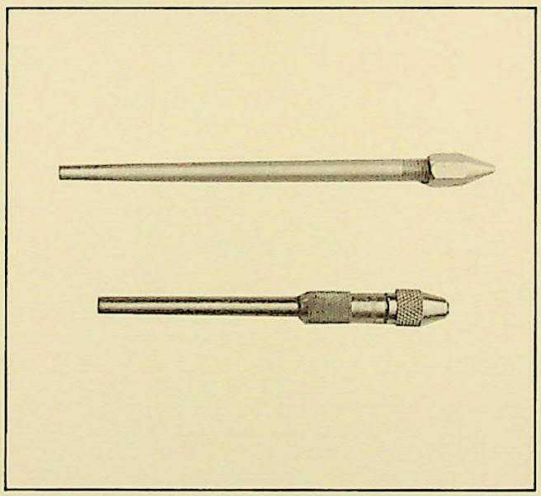


Figure 36 Micro Vise "VP" for needles and Micro Chuck "VC" for other tools.

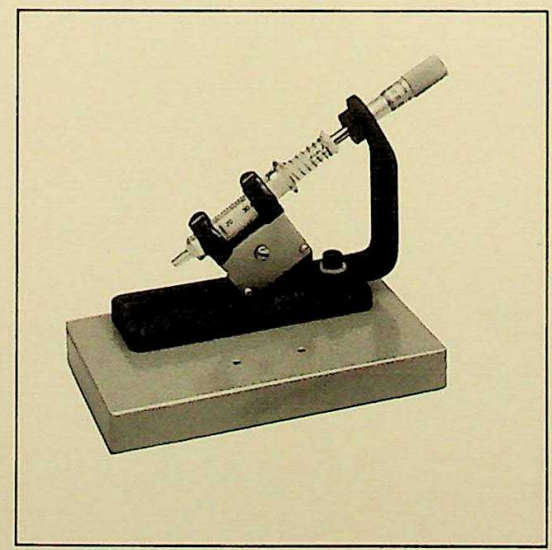


Figure 37 Micro Injection Apparatus (Cat. No. 06 90 24) on optional Small Steel Base (Cat. No. 06 90 78) and including optional Micrometer Screw (Cat. No. 06 90 26).

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